

Be it known that we, Seppo ALANARA and Jari PUPUTII, citizens of Finland and Hawk Yin PANG and Tatu KOLJONEN, citizens of Great Britain, have invented new and useful improvements in: WIRELESS TERMINAL HAVING A SCANNER FOR ISSUING AN ALERT WHEN WITHIN THE RANGE OF A TARGET WIRELESS TERMINAL of which the following is a specification.

WIRELESS TERMINAL HAVING A SCANNER FOR ISSUING AN ALERT
WHEN WITHIN THE RANGE OF A TARGET WIRELESS TERMINAL

BACKGROUND OF THE INVENTION

5 The present invention relates generally to wireless communications. More particularly, the present invention relates to a wireless terminal, method, and system for using the same, for issuing an alert when the wireless terminal is within range of a target device where communications can be conducted with the target device.

10 Handheld global positioning system (GPS) devices are well known. Such devices display the position of the device (longitude and latitude) relative to a map. These devices do not communicate with each other and cannot indicate to each other their positions relative to one another.

15 Further, these devices have undesirable limited accuracy since they make use of non-military GPS systems inhibiting the devices from providing location data having accuracy necessary to locate objects such as a car in a big parking lot, a person such as a child in a crowd, a theme park, or even a fixed known location such as a restaurant.

20 Still further, such devices do not perform communications and as such do not notify the user when they are within range of a target device where communications can be conducted with the target device.

25 Accordingly, a need exists in the wireless communications art for a wireless terminal capable of communicating with a target device and notifying a user of the wireless terminal when the wireless terminal is within range of the target device where communications can be conducted.

SUMMARY OF THE INVENTION

25 The present invention is directed to a wireless terminal, method, and system for using

the wireless terminal, for determining when the wireless terminal enters a coverage area of a target device having predefined identifying information, wherein the coverage area is an area within which communications are possible with the target device, and notifying the user of the wireless terminal that such an area has been entered.

5 The wireless terminal of the present invention includes an input device for inputting commands and data, an output device for outputting information, a transmitter/receiver circuit for transmitting and receiving wireless signals and a controller for controlling the input device, the output device and the transmitter/receiver circuit.

10 The controller of the wireless terminal of the present invention is settable by a user to one of a plurality of operation modes including a scanner mode. The scanner mode according to the present invention causes the wireless terminal to scan received wireless signals to determine whether identifying wireless signals identifying a target device as being associated with predefined information have been received and if the identifying wireless signals have been received outputting via the output device an indication that the wireless terminal is within range of the target
15 device where communications with the target device can be conducted. The operation modes of the wireless terminal could also include a target mode which causes the wireless terminal to operate as a target device and transmit identifying wireless signals identifying the wireless terminal as being associated with predefined information. The target device could also be a base station.

20 The predefined information can, for example, be information input by the user of the device identifying particular information the user wishes to have known by others to permit their response to such information when in range of the user's device. This information could, for example, be the user's name, hobbies, marital status, etc. The user of the wireless terminal can set the scanner mode to scan for identifying wireless signals indicating that the device that issued the identifying wireless signals has associated thereto predefined information input by the user of the device.

BRIEF DESCRIPTION OF THE DRAWINGS

The scope of the present invention will be apparent from the following detailed description, when taken in conjunction with the accompanying drawings, and such detailed description and specific examples, while indicating example embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description in which:

Fig. 1 schematically illustrates a wireless terminal according the present invention;

Fig. 2 illustrates a block diagram of the main elements of a wireless terminal;

Fig. 3 illustrates a network including a plurality of the wireless terminals shown in Fig. 1;

Fig. 4 is a schematic diagram of a network and its coverage area; and

Fig. 5 is a flowchart of the operation of the wireless terminal.

DETAILED DESCRIPTION OF THE INVENTION

Fig. 1 illustrates the exterior configuration of a wireless terminal 1 whereas Fig. 2 illustrates the internal configuration of the wireless terminal 1. The wireless terminal 1, includes a user interface having an input device which could, for example, be a keypad 2 and/or a touch sensitive screen provided on a display 3 or a microphone 6 and an output device which could, for example, be the display 3 or a speaker 5. The wireless terminal 1 is adapted for communications via a wireless network, e.g., a cellular network, bluetooth network, wireless local area network (LAN).

The keypad 2 has alphanumeric and function keys which allow the user to enter a telephone number, write a text message include messages to be sent by Short Message Service (SMS), write a name (associated with the telephone number), etc. As illustrated in Fig. 2, each of the above described input device and output device are controlled by a controller which could, for example,

be a processor 18. The processor interfaces to the display 3 which could, for example, be a liquid crystal display (LCD) via a LCD driver 13. The processor 18 also interfaces to the speaker 5 and the microphone 6 via an audio part 14. A transmitter/receiver circuit 19 is also controlled by the processor 18 for transmitting and receiving wireless signal from and in the wireless terminal 1.

- 5 The wireless terminal 1 can also include other elements such as a RAM, flash ROM, SIM card which used by the processor 18 so as to implement the various functions of the wireless terminal 1.

Fig. 3 schematically illustrates a network 50 serviced by a base station 52 and a plurality of wireless terminals 1a, 1b and 1c each of which has the elements described above with respect to the wireless terminal 1. Each of the wireless terminals 1a-c can communicate with each other via the base station 52 or directly to each other using wireless signals, such as Bluetooth.

10 A unique feature of the present invention is that a function (scanner mode) is provided within each of the wireless terminals 1a-c for issuing an alert when the wireless terminal 1a-c is within range of a target device where communications can be conducted with the target device. It should be noted that the alert disclosed herein is described as being issued when the wireless terminal 1a-c enters a coverage area of the target device. A similar alert can also be issued in the target device indicating that a wireless terminal 1a-c has entered the coverage area of the target device.

15 The alert can also be issued in a manner opposite to that described above, such as when the wireless terminal 1a-c exits the coverage area of the target device. Here again, a similar alert can be issued in the target device indicating that a wireless terminal 1a-c has exited the coverage area of the target device. Therefore, at each instance where the alert is described as being issued it should be understood that this issuing of the alert is inclusive of all of the above described manners for issuing the alert, even though only one method may be described.

20 The target device could, for example, be another of the wireless terminals 1a-c, the base

station 52, or any other such device which emits identifying wireless signals which identify the target device as being associated with predefined information, thereby indicating the target device as one for which communications between the wireless terminal 1a-c and the target device can be conducted.

5 The predefined information can, for example, be information input by the user of the device identifying particular information the user wishes to have known by other to permit their response to such information when in range of the user's device. This information could, for example, be the user's name, hobbies, marital status etc. The user of the wireless terminal can set the scanner mode to scan for identifying wireless signals indicating that the device that issued the identifying
10 wireless signals has associated thereto predefined information input by the user of the device.

 The function of the present invention described above is implemented in the wireless terminal 1a-c, for example, by the processor 18 executing particular software (computer program) causing the processor 18 to control the operations of the input device, output device and transmitter/receiver circuit 19. This program can be preinstalled in memory or later installed by
15 upgrade

 Thus, for example, the wireless terminal 1a when implementing the above described function of the present invention issues an alert to the user of wireless terminal 1a as it enters a range or area surrounding the base station 52 or wireless terminal 1b where communications with the base station 52 or wireless terminal 1b can be conducted. This alert can take the form of a
20 sound output by the speaker, an indicator/icon or text output on the LCD 3, or vibrations output by a vibrator (not shown) within the wireless terminal 1a. This alert is generated in such a manner so as to ensure that the user of the wireless terminal 1a receives this notification without having to check the received signal indicator on the wireless terminal 1a at frequent intervals.

 A further unique feature of the present invention is that a further function (target mode) can

be provided within each of the wireless terminals 1a-c or the base station 52 for causing the wireless terminal 1a-c or base station 52 to act as a target device by issuing identifying wireless signals identifying the target device as being associated with predefined information. These identifying wireless signals identify the wireless terminal 1a-c or base station 52 as a device for which communications can be established. The predefined information as described above can, for example, be information input by the user of the device identifying particular information the user wishes to have known by other to permit their response to such information when in range of the user's device. This information could, for example, be the user's name, hobbies, marital status, etc. The user of the wireless terminal can set the scanner mode to scan for identifying wireless signals indicating that the device that issued the identifying wireless signals has associated thereto predefined information input by the user of the device.

The identifying wireless signals are received by wireless terminals 1a-c when the wireless terminal 1a-c are within range of the target device. This range can be of any dimension as defined by the particular wireless protocol being used e.g., cellular network, Bluetooth network, wireless local area network (LAN).

It should be noted that any device can act as a target device so long as the device can emit identifying wireless signals which identify the device as being associated with predefined information and one for which communications between the wireless terminal 1a-c and the target device can be conducted.

The further function of the present invention described above is implemented in the wireless terminal 1a-c, for example, by the processor 18 executing particular software (computer program) causing the processor 18 to control the operations of the input device, output device and transmitter/receiver circuit 19. This program can be preinstalled in memory or later installed by upgrade.

Similar apparatus and software (computer program) can be provided in the base station 52 and any other device that acts as a target device so as to implement this further function of the present invention.

Thus, for example, the wireless terminal 1a or the base station 52 when implementing the
5 above described further function of the present invention issues identifying wireless signals indicating that the wireless terminal 1a or the base station 52 is associated with predefined information and that any of the wireless terminals 1a-c within range of receipt of the identifying wireless signals can establish communications with the wireless terminal 1a or base station 52. Any wireless terminal 1a-c receiving the identifying wireless signals implements the above
10 described function of the present invention of alerting the user of wireless terminal 1a-c that it has entered a range or area surrounding the wireless terminal 1a or base station 52 where communications with the wireless terminal 1a or base station 52 can be conducted.

To further explain the above Fig. 4 illustrates the present invention where a plurality of wireless terminals 1a-d operates in association with a base station 52. The base station 52 acting as
15 a target device has a coverage area 54 and wireless terminal 1a acting as a target device has a coverage area 55. As shown since wireless terminals 1a-c are within the coverage area 54 of the base station 52, each of these wireless terminals 1a-c receives the identifying wireless signals emitted by the base station 52 and alerts their users that communication can be established with the base station 52. As described above this alert can be provided by sound, vibration or an
20 indication/icon or text 20a-c on the display of the wireless terminal 1a-c.

Since the wireless terminal 1d is outside of the coverage area 54, wireless terminal 1d does not receive the identifying wireless signals emitted by the base station 52 and therefore does not alert the user that communication can be established with the base station 52. However, the wireless terminal 1d is within the coverage area 55 of the wireless terminal 1a. Thus, the wireless

terminal 1d receives the identifying wireless signals emitted by the wireless terminal 1a and alerts its user that communication can be established with the wireless terminal 1a. As described above this alert can be provided by sound, vibration or an indication/icon or text 21d on the display of the wireless terminal 1d. A similar alert can be provided in the wireless terminal 1a acting as a target
5 device. As described above this alert provided on the wireless terminal 1a can be provided by sound, vibration or an indication/icon or text 21a on the display of the wireless terminal 1a.

According to the present invention as illustrated in Fig. 5, a user can cause each of the wireless terminals 1a-d to operate in any one of a plurality of operation modes including the scanner mode and the target mode as described above. Specifically as illustrated in Fig. 5, the user
10 is allowed to input an operation mode command into the wireless terminal 1a-d. The processor 18 of the wireless terminal 1a-d analyzes the operation mode command to determine whether the user selected the scanner mode or the target mode (step 501).

If the scanner mode was selected, the wireless terminal 1a-d is placed in the scanner mode and begins scanning wireless signals received via the transmitter/receiver circuit 19 (step 502).
15 The received wireless signals are analyzed to determine whether the received wireless signals are identifying wireless signals from a target device (step 503). If the received wireless signals are identifying wireless signals indicating that the target device is associated with predefined information, then the user of the wireless terminal is alerted (step 504). If the received wireless signals are not identifying wireless signals the scanning continues via step 502.

20 If the target mode was selected, the wireless terminal 1a-d is placed in the target mode and begins emitting identifying wireless signals indicating that the wireless terminal 1-d is associated with predefined information input to the wireless terminal 1a-d by the user. The identifying wireless signals are transmitted via the transmitter/receiver circuit 19 (step 505). Thereafter, the wireless terminal 1a-d could, for example, monitor all received wireless signals to determine

whether a wireless terminal in the scanner mode has come within range (step 506). This example would require the wireless terminal in the scanner mode to emit some type of identifying wireless signal when it enters the coverage area of a target device. If a wireless terminal in the scanner mode is within range, then the wireless terminal 1a-d alerts the user and establishes
5 communication with the wireless terminal in the scanner mode (step 507). If a wireless terminal in the scanner mode is not within range, then the emitting of identifying wireless signals continues via step 505.

As per the above, the target device could, for example, be a wireless terminal as described above, a base station 52, or any other device which can emit identifying wireless signals. Such a
10 base station 52 or device has an operation mode such as that described above that allows it to act as a target device according to steps 505-507 as illustrated in Fig. 5.

While the present invention has been described in detail and pictorially in the accompanying drawings it is not limited to such details since many changes and modifications recognizable to those of ordinary skill in the art may be made to the invention without departing
15 from the spirit and the scope thereof.